OCR
RECOGNISING ACHIEVEMENT

GCSE

Design and Technology

General Certificate of Secondary Education

Unit **A542:** Industrial Technology Sustainable Design

Mark Scheme for January 2013

Oxford Cambridge and RSA Examinations

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations

Annotation	Meaning
	Unclear
	Benefit of doubt
	Irrelevant (used for languages)
	Two statements are linked
	Benefit of doubt not given
	Poor diagram
	Repeat
	Noted but no credit given
	Tick
	Too vague
	Cross

SECTION A

Question			Answer	Marks	Guidance
1			**b**	1	Only acceptable response.
2			**c**	1	Only acceptable response.
3			**d**	1	Only acceptable response.
4			**c**	1	Only acceptable response.
5			**a**	1	Only acceptable response.
6			Control of substances hazardous to health.	1	Only acceptable answer.
7			Carbon footprint logo.	1	Only acceptable answer.
8			Incineration, sending to landfill, fly tipping, littering, dumping.	1	1 mark for a correct response.
9			Accept planned obsolescence, obsolescence, built-in-obsolescence.	1	Only acceptable responses.
10			Smart materials.	1	Only acceptable response.
11			True	1	Only acceptable answer.
12			True	1	Only acceptable answer.
13			False	1	Only acceptable answer.
14			False	1	Only acceptable answer.
15			True	1	Only acceptable answer.
			Section A Total	**15**	

SECTION B

Question			Answer	Marks	Guidance
16	(a)		**Secondary recycling** – waste materials are recycled into different types of products. Creating a new product from an old one.	1	Only suitable answer.
	(b)		Refuse – The designer has made it possible to refuse to use non-sustainable materials such as plastic and metal. Refuse to dispose of cardboard in landfill. Refuse to use more energy to obtain a raw material as cardboard is readily available. Sustainability – making cardboard furniture is very sustainable, as packaging can be recycled. The cardboard can be derived from sustainable forests. Less waste to landfill and less reliance on non-renewable materials, such as metal/plastic. Disposal – if the cardboard reaches the end of its life, or is disposed of inappropriately it will biodegrade in landfill or can be used to make compost. It can also be recycled.	6	Full justified explanation 2 marks each.

Question			Answer	Marks	Guidance	
					Content	**Levels of response**
16	**(c)***		Discussion to revolve around the following themes: Non-recyclable or difficult to recycle products end up in landfill or are incinerated, which causes pollution and contributes to global warming. Extraction/transportation/processing of the raw materials causes environmental damage, which could be reduced by recycling the materials. The depletion of the world's finite natural resources such as oil, coal natural gas can be reduced. Problems linked to CO_2 emissions when producing raw materials/transporting /manufacturing can be reduced by recycling materials for reuse. Examples could include – designing products from recyclable materials & using recycled materials. Designing products, which will use as little material as possible but still retain their physical integrity. Designing products, which can be disassembled easily for recycling. Planned obsolescence.	6	Basic **discussion**. There will be little or no use of specialist terms. Answers may be ambiguous or disorganised or 'list like'. Errors of grammar, punctuation and spelling may be intrusive. List of **one** or **two** points maximum **one** mark. List of **three** or more maximum **two** marks. Adequate **discussion**, showing some understanding. There will be some use of specialist terms, although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, grammar and punctuation Thorough **explanation.** There will be three or more clearly identified and explained points. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate will demonstrate the accurate use of spelling, punctuation and grammar.	**Level 1 (0–2 marks)** **Level 2 (3–4 marks)** **Level 3 (5–6 marks)**

Question			Answer	Marks	Guidance
	(d)		Manufacturer could place the recycling logo on the product. Manufacturers could include a leaflet stating the benefits of recycling. A sticker explaining how the consumer can recycle the item could be placed on the product. Manufacturers could offer discounts on their products if the consumer returned the product to their supplier for recycling.	2	1 mark for each fully explained point with no repetition.
17	**(a)**		Less environmental impact as used for much longer – so less landfill taken up and less toxic materials in environment. Convenient as can be charged whilst in laptop, so no need to replace the batteries constantly. Cheaper than buying batteries.	2	1 mark for each correct response (max 2).
	(b)		Product analysis is a study of a product, and similar products to establish their strengths and weaknesses, as compared to each other. Following on from this analysis an improved product may be developed.	3	1 mark for each correct point made (max 3).
	(c)		Ergonomics – Comfortable to place on lap. Keys are easy to press and easy to access. Easy to fold screen down. All features comfortable and straightforward to use. Comfortable to carry. Size of keys to accommodate average fingertips. Wide enough to fit across lap width. Distance of screen comfortable to view. Buttons to eject CD correct size for finger etc. Mouse shaped to hand and position of buttons and roller for fingers. Wrist pads to support arms and reduce effect of RSI. Other relevant ergonomic feature.	6	2 marks for each justified point made.
	(d)		Advantages – little or no waste. Sprues etc. can be recycled and used again. Injection moulding process uses plastics that can be recycled. Process can use recycled thermoplastic. Products are virtually all perfect within tolerance so again little waste. Few if any finishing costs/energy requirements. Disadvantages – Plastics are not sustainable. The process uses a relatively high amount of energy. Large buildings are required to house the equipment. Uses fossil fuels.	4	1 mark for each point made (max of 4 marks).

Question			Answer	Marks	Guidance
18	(a)		Wind farm.	1	Only answer.
	(b)		There is no pollution caused by generating the electricity. After set up costs are retrieved electricity is low cost. Fossil fuels are preserved for other uses. Fossil fuels preserved for future generations.	4 (2x2)	2 marks for each justified benefit.
	(c)		Many people consider that large turbines spoil the landscape, particularly as most wind farms are situated in rural locations. Large pylons are often built across the countryside to deliver the energy to the national grid further damaging the environment.	2	2 marks for a full justified answer.
	(d)		Solar, Geothermal, hydro, tidal/wave power.	2	1 mark for each form of sustainable power identified (2 max).
	(e)	(i)	Mild Steel, Steel.	1	
		(ii)	Extracting raw materials for steel manufacture causes environmental damage including deforestation and destruction of natural habitats. Use of extraction machinery causes further pollution contributing towards global warming, as does the distribution of the raw material. Processing of the raw material and manufacture of the pylon also uses a great deal of energy further increasing pollution levels and global warming.	2	1 mark for each justified point (2 max).
	(f)		Sustainable energy use needs to be increased to decrease the reliance on fossil fuels, which contribute towards global warming and other forms of pollution. Greater sustainable energy use will also help preserve fossil fuels for future generations, particularly for use where alternatives have not been developed. Sustainable energy use also needs to be increased, so that sufficient energy is available when fossil fuels are exhausted.	3	1 mark for each fully explained point (3 max).
			Section B Total	**45**	
			Question Paper Total	**60**	

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